084
Revised 5/27/22

STATE OF WASHINGTON

STATE BUILDING CODE COUNCIL

Washington State Energy Code Development

Standard Energy Code Proposal Form

Log No. __084_____

Code being amended: ☐ Commercial Provisions ☒ Residential Provisions

Code Section # R202 – Definitions, R401.1 – Scope

Brief Description:

Move low-rise multifamily buildings (with dwelling units accessed from interior corridors) from the "residential building" category into the "commercial building" category.

Proposed code change text:

RESIDENTIAL BUILDING. For this code, ((~~includes,~~)) the following building types are residential buildings:

1. Detached one- and two-family dwellings
2. Multiple single-family dwellings (townhouses)
3. ((~~and Group R-2,~~)) Group R-3 and R-4 buildings three stories or less in height above grade plane
4. Group R-2 buildings three stories or less in height above grade plane whose dwelling units are accessed directly from the exterior
5. Accessory structures ~~thereto~~ to residential buildings

Group R-2 buildings with *dwelling units* accessed from interior corridors or other interior spaces are not *residential buildings*.

R401.1 Scope. This chapter applies to *residential buildings*. Group R-2 buildings with *dwelling units* accessed from interior corridors or other interior spaces must comply with the WSEC--Commercial Provisions.

> **Exception**: Water heaters that each serve only an individual Group R-2 dwelling unit are permitted to conform to the requirements of the WSEC – Residential Provisions.

Purpose of code change:

This code change provides a uniform set of code requirements for all multifamily buildings, with the exception of "woody walkup" buildings that have exterior walkway access to the dwelling units. There is no reason for three-story apartments and four-story apartments to be built under entirely different sets of code requirements.

Inclusion of low-rise multifamily under the commercial energy code will result in nearly identical annual energy use, but will allow jurisdictions with advanced local energy codes to bring them to the same standard that is applied to their medium-rise multifamily buildings.

Note that low-rise hotel/motel buildings, a very similar building type, are already built in conformance with the commercial code provisions.

Please refer to the March 2022 comparison study by Ecotope appended to this proposal.

It is the proponent's intention to propose this change to the IECC.

Your amendment must meet one of the following criteria. Select at least one:

- ☐ Addresses a critical life/safety need.
- ☐ The amendment clarifies the intent or application of the code.
- ☒ Addresses a specific state policy or statute. (Note that energy conservation is a state policy)
- ☐ Consistency with state or federal regulations.
- ☐ Addresses a unique character of the state.
- ☐ Corrects errors and omissions.

Check the building types that would be impacted by your code change:

- ☐ Single family/duplex/townhome
- ☒ Multi-family 1 – 3 stories
- ☐ Multi-family 4 + stories
- ☐ Commercial / Retail
- ☐ Institutional
- ☐ Industrial

Your name	Duane Jonlin	Email address	duane.jonlin@seattle.gov
Your organization	Self	Phone number	206-233-2781
Other contact name	Click here to enter text.		

Economic Impact Data Sheet

Is there an economic impact: ☐ Yes ☐ No ☒ Maybe

Briefly summarize your proposal's primary economic impacts and benefits to building owners, tenants, and businesses. If you answered "No" above, explain your reasoning.

There *may* be an economic impact, but the cost could be either higher or lower, depending almost entirely on the selection of additional efficiency packages that is assumed for each code in the comparison. For this reason, the cost in the section below is assumed to be zero.

For commercial code compliance, a high-performance central heat pump water heater provides all the required credits under the 2015 WA commercial code and adds about $800 per unit compared with a conventional gas water heating system. For compliance with the 2015 Seattle code, which contains many of the requirements currently proposed for the 2018 WA code, that HPWH system, plus credits for DOAS (which is already required by other parts of the code) and lighting provide the required 8 credits, and is likely to add less than $1000 per unit, which is comparable to the cost of any combination of additional efficiency measures selected to comply with Section R406 in the residential energy code.

There are some prescriptive code differences that may impact cost. When using the commercial buildings provisions:

- Baseline opaque envelope R-values will be slightly less stringent
- Air barrier leakage resistance requirement will be more stringent
- Required ERV efficiency will be slightly more stringent (1.2 cfm/W vs. 1.0 cfm/W)
- Balanced ventilation requirement is already required for low-rise multifamily dwelling units by Section 403.4.4.1 of the Washington State Mechanical Code, so that requirement is not affected by this code change.

Provide your best estimate of the **construction cost** (or cost savings) of your code change proposal?

$Zero/square foot ($Zero/ dwelling unit)

Show calculations here, and list sources for costs/savings, or attach backup data pages

Provide your best estimate of the **annual energy savings** (or additional energy use) for your code change proposal?

Zero KWH/ square foot (Zero KWH/ dwelling unit)

Show calculations here, and list sources for energy savings estimates, or attach backup data pages

List any **code enforcement** time for additional plan review or inspections that your proposal will require, in hours per permit application: None

Small Business Impact. Describe economic impacts to small businesses: Small business contractors that construct low-rise multifamily buildings, but not low-rise hotel/motel buildings, will have to learn new code requirements.

Housing Affordability. Describe economic impacts on housing affordability: Likely zero impact.

Other. Describe other qualitative cost and benefits to owners, to occupants, to the public, to the environment, and to other stakeholders that have not yet been discussed: There are advantages for code understanding, enforcement, and compliance in having a single set of requirements for all multifamily buildings, regardless of height. In addition, this will allow individual jurisdictions to set a higher building performance standard for low-rise multifamily buildings, as they now do for medium-rise buildings, thus moving the state closer to its goals for efficiency and carbon reduction.

March 2022 Code Comparison Study by Ecotope for NEEA

Multifamily R-2 – Building Geometry & Space Types

	Woody Walk-Up	Double Loaded Corridor
Total Area	7,616 ft²	26,400 ft²
Floors	2	3
Fenestration %	18%	34%
Residential Space %	88%	87%
Corridor Space %	N/A	9%
Office/Amenity Spaces (Gym, Lounge, etc.) %	13%	4%

Multifamily R-2 – Model Inputs

Component	2018 WSEC-R Model	2018 WSEC-C Model
Building Thermal Envelope		
Above Grade Wall	2x6 int. R-21 → U-0.056	2x8 std. R-25 → U-0.051
Glazing	U-0.30, SHGC-N/A	U-0.30; SHGC (PF<2) - 0.38 (S,E,W); 0.51 (N)
Roof (Flat Ceiling)	R-49 → U-0.026	R-49 → U-0.021
Floor Over Unheated	R-30 → U-0.029	R-30 → U-0.029
Slab-on-Grade	R-10 for 2ft → F-0.54	R-10 for 2ft → F-0.54
Infiltration	5 ACH50	0.40 cfm/ft²
Building Systems		
Heating ~~& Cooling~~	ER Heat: η = 1.0	ER Heat: η = 1.0
Ventilation	ERV – 1.0 cfm/W, 60% Sensible HR Schedule: Cycle 24 hr/day	ERV – 1.2 cfm/W, 60% Sensible HR; Schedule: Cycle 24 hr/day
DHW System	Elec. Resistance: η = 0.95	Elec. Resistance: η = 0.95
Hot Water Consumption	Q_{DHW} (kWh/yr) = 570+1034(#occ) Add: 10% reduction for low-flow showerheads	Q_{DHW} (kWh/yr) = 570+1034(#occ) Add: 10% reduction for low-flow showerheads
Thermal Loads		
Lighting Loads/Gains	90% high efficacy (LED fixtures at 65 lumen/W) (Assuming 0.44 W/ft² – Double Loaded Corr.) (Assuming 0.42 W/ft² – Woody Walk Up)	Common areas - 0.41 W/ft²; Dwelling Units - Unregulated (Assuming 0.44 W/ft² – Double Loaded Corr.) (Assuming 0.42 W/ft² – Woody Walk-up)
Equipment Loads/Gains	Unregulated (assuming 0.75 W/ft²)	Unregulated (assuming 0.75 W/ft²)
Occupancy Loads/Gains	*Occupant Density* - 250 ft²/person *Occupancy Gains* – 250 Btu/h (Sensible), 200 Btu/h (Latent)	*Occupant Density* - 250 ft²/person *Occupancy Gains* – 250 Btu/h (Sensible), 200 Btu/h (Latent)

Additional Efficiency Measures – C406 & R406

Optional Measures	From Table R406.3 – 4.5 Credits required	From Table C406.1 – 6 credits required

Package #1: HPWH Emphasis	**1.2** Windows = U-0.20 (1 Credit) **2.2:** 2 ACH50, 65% HRV (1.5 Credits) **5.6:** Tier III HPWH (3 Credits) **R406.2.3:** ER Heat (-1 Credit)	**C406.9:** HPWH w/ min. COP of 3.0 (8 Credits)
Package #2: Envelope Emphasis	**7.1:** Energy Star Appliances (1.5 Credits) **3.4:** Ductless Heat Pumps, HSPF≥10 (2 Credits) **1.4:** Windows = U-0.25; (1 Credit) Wall = U-0.045; Floor = U-0.025; Slab = F-0.36;	**C406.10:** Max 85% of permitted UA (6 Credits)

Energy Study Results

Double Loaded Corridor - EUI (kBtu/sf/yr)

	WSEC-R Baseline	R406 Package #1	R406 Package #2	WSEC-C Baseline	C406 Package #1	C406 Package #2
PLUG LOADS	7.3	7.3	7.3	7.3	7.3	7.3
INTERIOR LIGHTS	4.8	4.8	4.8	4.6	4.6	4.6
SPACE HEATING	5.4	3.7	2.0	4.3	4.3	3.6
SPACE COOLING	0.0	0.0	1.4	0.0	0.0	0.0
HEAT REJECTION	0.0	0.0	0.1	0.0	0.0	0.0
FANS	2.7	2.7	2.7	2.3	2.3	3.2
DOMESTIC HOT WATER	6.8	3.3	6.8	6.8	3.3	6.8
EUI	**27**	**22**	**25**	**25**	**22**	**25**

Woody Walk-up - EUI (kBtu/sf/yr)

	WSEC-R Baseline	R406 Package #1	R406 Package #2	WSEC-C Baseline	C406 Package #1	C406 Package #2
PLUG LOADS	8.0	8.0	8.0	8.0	8.0	8.0
INTERIOR LIGHTS	5.2	5.2	5.2	4.9	4.9	4.9
SPACE HEATING	8.3	5.2	2.3	7.2	6.9	6.3
SPACE COOLING	0.0	0.0	0.6	0.0	0.0	0.0
HEAT REJECTION	0.0	0.0	0.04	0.0	0.0	0.0
FANS	3.8	2.8	4.0	2.4	3.3	3.3
DOMESTIC HOT WATER	7.3	3.6	7.3	7.3	3.6	7.3
EUI	**33**	**25**	**27**	**30**	**27**	**30**